

REMARKS

As a preliminary matter, Applicants respectfully request acknowledgment and consideration of the Information Disclosure Statement (IDS) filed on February 13, 2006.

Claim 2 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. More specifically, the Examiner asserts that the claim is unclear because the claim language fails to define a point from which the outer diameter of the belt reinforcement layer is measured. Applicants assert that the term “outer diameter of the belt reinforcement layer” inherently refers to the distance from an outer edge of the belt reinforcement layer to the opposing outer edge of the belt reinforcement layer, passing through the axis of rotation of the tire. Accordingly, withdrawal of the § 112 rejection of claim 2 is respectfully requested.

Claims 1, 2, and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirai (JP 2003002015) in view of Riva (WO 03/008207). Applicants traverse this rejection because the cited prior art, taken alone or in combination, does not disclose or suggest that the belt reinforcement layer is formed of organic fiber reinforcing cords, or that the intermediate elongation of reinforcing cords of the belt reinforcement layer after vulcanization and under a load of 67 N is set to a range of 1.5% to 5.5%, as now recited in claim 1.

The present invention, at paragraph [0016], teaches that reinforcing cords used in the belt reinforcement layer are made from an organic fiber. Additionally, the reinforcing cords used have an intermediate elongation in a range of 1.5% to 5.5% in a vulcanized tire.

Setting the intermediate elongation of the reinforcing cords to be in this range advantageously produces a durable tire that also reduces road noise.

The Examiner acknowledges that Hirai is silent regarding the reinforcing elements of the reinforcing layer, and relies on Riva to disclose the above features. Riva discloses that a reinforcing layer contains reinforcing elements, which are steel wires generally preformed to have a wave shape (see Fig. 2 of Riva), and not organic fibers, as in the present invention. Additionally, these wave-shaped reinforcing elements are used in green tires, prior to vulcanization. However, the initial preforming of the reinforcing elements is cancelled during the vulcanization and molding of the tire (see Riva, p. 16, lns. 20-21). In other words, when the green tire is pushed against the mold in the molding and vulcanizing step, the reinforcing elements embedded in the green tire are stretched and lose their wave shape. This stretching also causes an increase in the amount of tension required to deform the reinforcing elements.

Fig. 6 of Riva is a stress-strain diagram of three single wires A, B, and C. Wire A is not preformed, while wires B and C are preformed to have a wave shape. While wires B and C show considerable elongation at low stress levels, wire A shows a deformation of less than 0.5% at a stress of 67N. Because the reinforcing elements used in Riva have a shape similar to that of wire A after vulcanization (i.e., the reinforcing elements lose their preformed shape during the vulcanization process), Applicants assert that the stress-strain characteristics of the reinforcing elements after vulcanization will be similar to those of wire A as well. In other words, Applicants assert that the reinforcing elements of Riva will not

have an intermediate elongation in a range of 1.5% to 5.5% under a load of 67N after vulcanization of the tire in Riva.

Accordingly, Riva, whether taken alone or combined with Hirai, does not disclose or suggest a belt reinforcement layer formed of organic fiber reinforcing cords, or an intermediate elongation of the reinforcing cords of the belt reinforcement layer after vulcanization and under a load of 67 N being in a range of 1.5% to 5.5%, as now recited in claim 1. Thus, Applicants assert that claim 1 is allowable over the cited prior art, and respectfully request withdrawal of the rejection of independent claim 1 and its associated dependent claims.

Regarding claim 2, Applicants further traverse the rejection because Hirai and Riva, whether taken alone or in combination, do not disclose or suggest that the outer diameter of the belt reinforcement layer in the tread center portion of the tire is set to be 1.065 to 1.13 times the outer diameter of the belt reinforcement layer at a terminal edge of the belt reinforcement layer.

In the present invention, the outer diameter of the belt reinforcement layer at tread center is 1.065 to 1.13 times that of the belt reinforcement layer at a terminal edge of the belt. This ratio allows a load received by the terminal edge of the belt reinforcement layer to be reduced. Thus, durability of the belt reinforcement layer is advantageously increased.

The Examiner asserts that Hirai discloses the above feature. However, as shown in Figs. 1-5 of Hirai, the reinforcing layer 8 takes the form of an arc having a

relatively small radius of curvature, as shown in Figs. 1-5. Thus, Applicants assert that Hirai does not disclose or suggest limiting the outer diameter of the reinforcing layer at the tread center to 1.065 to 1.13 times that of the reinforcing layer at a terminal edge of the reinforcing layer, as in the present invention. Accordingly, Applicants assert that claim 2 is additionally allowable for this reason, and again request withdrawal of the rejection of claim 2.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirai and Riva, and further in view of Poque (DE 4209817). Claim 3 depends from independent claim 1, and as such necessarily incorporates all the features of claim 1, plus additional features. Accordingly, Applicant respectfully requests that the rejection of dependent claim 3 be withdrawn in light of the above remarks directed to Claim 1, and because Poque does not remedy the deficiencies identified with respect to the rejection of claim 1.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirai and Riva, and further in view of Nishizawa (U.S. Patent No. 4,836,262). Applicants traverse this rejection because the cited prior art references, whether taken alone or in combination, do not disclose or suggest that the cord-to-cord distances between the belt reinforcement layer and the belt layer, and between the belt reinforcement layer and the carcass layer are set between 0.5 mm and 1.5 mm.

The Examiner admits that Hirai and Riva do not disclose or suggest this feature of the present invention, and relies on Nishizawa to disclose the above features. However, Nishizawa merely discloses that the shortest vertical distance L between the “most adjacent”

metal filaments in opposed metal cords of adjoining metal cord layers is between 0.5 mm and 1.3 mm (see col. 2, ln. 65 – col. 3, ln. 1). That is, Nishizawa discloses a vertical distance between two adjacent belt layers. However, Nishizawa is silent regarding the distance between a belt reinforcement layer and a belt layer, or the distance between a belt reinforcement layer and a carcass layer.

In contrast, the present specification discloses, at paragraph [0021], that a cord-to-cord distance between a belt reinforcement layer and a belt layer, and between the belt reinforcement layer and a carcass layer, are each between 0.5 mm and 1.5 mm, inclusive. This distance advantageously reduces road noise, and increases high-speed durability by reducing cord-to-cord contact. Because Hirai, Riva, and Nishizawa, whether taken alone or in combination, fail to disclose or suggest this feature, Applicants respectfully request withdrawal of the rejection of claim 4.

For all the above reasons, Applicants respectfully request reconsideration and allowance of the claimed invention. The Examiner should contact Applicants' undersigned attorney if a telephone conference would expedite prosecution.

Respectfully submitted,

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